

NATIONAL PARK SERVICE
GREAT SMOKY MOUNTAINS NATIONAL PARK
BRIEFING STATEMENT

February 2004



Split view of Great Smoky Mountains National Park from Look Rock Observation Tower. On the left shows natural annual visibility of 113 miles. On the right shows current annual average visibility of 25 miles. Summer average visibility is 15 miles, but should be 77 miles. Real-time web-cam views, air quality data, and weather information are available on line at:

<http://www2.nature.nps.gov/air/WebCams/parks/grsmcam/grsmcam.htm>

<http://www2.nature.nps.gov/air/webcams/parks/grsmpkcam/grsmpkcam.htm>

Subject: Air Quality Issues and Class I Area Responsibilities

Problem/Issues: Monitoring and research conducted over the past 24 years in Great Smoky Mountains National Park (GRSM) has shown that airborne pollutants emitted outside the Park and transported into the Park, are significantly impacting Park resources (streams, soils, vegetation and visibility), visitor enjoyment and public health. The burning of fossil fuels (e.g. coal, oil, and gas) produces emissions of sulfur dioxide and nitrogen oxides that convert into harmful secondary pollutants (e.g. sulfates, nitrates and ozone). Winds coming into the southern Appalachian Mountains carry pollutants from as far away as the Tennessee, Ohio, and Mississippi River valleys, the industrial cities of the Southeast and Midwest, the Gulf States and the Northeast. The height and physical structure of the mountains, combined with predominant weather patterns, tend to trap and concentrate air currents entering the southern Appalachians.

Clean Air Act Requirements: Congress passed the Clean Air Act (Act) in 1970, establishing national policy toward preserving, protecting, and enhancing air quality. The 1977 Clean Air Act Amendments designated all national parks that exceeded 6,000 acres in size as mandatory Class I areas worthy of the greatest degree of air quality protection under the Act. The 1990 Amendments to the Act left intact the requirements for Class I area protection, while providing additional tools to accomplish the protection. Under the Act, the federal land manager has been given the affirmative

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responsibility to assure that air quality and the air quality-related values in Class I areas, such as GRSM, do not deteriorate, and to take an aggressive role in protecting, preserving and enhancing the Park's resources.

Visibility Impairment from Regional Haze: Visibility at GRSM has been seriously degraded over the last 50 years by human-made pollution. Since 1948, based on regional airport records, annual average visibility in the southern Appalachians has decreased 60% overall, 80% in summer, and 40% in winter. Summer used to have some of the best visibility, and now it has the worst. Tiny sulfate particles, from the transformation of sulfur dioxide emissions from burning coal by power plants, causes light to be scattered and is responsible for 83 percent of the chronic visibility impairment during the summer months. Increasingly, visitors are no longer seeing the sweeping mountain vistas because of this haze. Scenic views at GRSM are impaired by pollutants more than 90 percent of the time with haziness in the summer months so bad that on average, one can only see 14 miles, when you should be able to see 77 miles. During severe haze episodes, visibility has been reduced to less than one mile. Annual average visibility at GRSM is 25 miles when it should be about 113 miles. Declining visibility is well correlated with increasing emissions of sulfur dioxide. Fine particulate matter, summer sulfate concentrations, light extinction, and haziness have not decreased since 1988. In April of 1999, EPA promulgated the Regional Haze Rule that requires visibility in the Class I areas, including GRSM, to improve our haziest days to natural conditions by 2064 and to preserve the clearest days presently being experienced. The Tennessee Valley Authority announced in Fall 2001, that they will be put SO₂ controls on 3 of the closest power plants to the Park, which will reduce SO₂ emissions from those plants by over 95 percent.

Ozone Pollution and Effects to Vegetation: Ground-level ozone (O₃) pollution, produced by the reaction of nitrogen oxides and volatile organic compounds in the presence of sunlight, is one of the most serious and pervasive air pollutants injuring vegetation at GRSM. Ozone exposures at GRSM are among the highest in the eastern U.S. and have exceeded the National Ambient Air Quality Standard (NAAQS) for the protection of public health. Since 1990, the Park has exceeded the 8-hour ozone standard to protect public health on 289 different days. Ozone is transported long distances from large urban areas to rural forested areas like GRSM. On average, daily O₃ levels over the ridge-tops of the Park are up to two times higher than Knoxville or Atlanta levels. Since 1984, field surveys have identified 90 plant species that exhibit O₃-like foliar injury symptoms in the Park. Thirty species of plants that were exposed to O₃ under controlled conditions in fumigation chambers, showed foliar damage at O₃ levels that occur in the Park. To further quantify this injury, permanent vegetation monitoring plots and field surveys were conducted. In general, the higher the elevation, the more severe the O₃ concentrations and leaf injury. In especially sensitive species including black cherry and tall milkweed, the incidence of O₃ injury can be as high as 90 percent and is having overt effects to the vegetation of the Park. Ozone is also causing certain sensitive plant species to grow slower (e.g., yellow-poplar and black cherry).

Acid Deposition Impacts to Aquatic and Terrestrial Resources: The Park receives some of the highest deposition rates of sulfur and nitrogen of all monitored locations in North America. These pollutants are deposited in the form of, not only rainfall, but from large amounts of dry particles and cloud water. Annual wet nitrate deposition has increased 15 percent from 1981-2002 at GRSM. The annual average acidity (pH) of rainfall at the Park is 4.5, 10 times more acidic than natural rainfall pH (5.0-5.6). Cloud water acidity averages 3.5 pH and has been measured as low as 2.0 pH. Cloud-water concentrations of sulfate, nitrate, hydrogen, ammonium, and calcium have increased since 1994. Both long-term chronic and episodic acidification are adversely affecting sensitive streams and soils. Most high-elevation Park streams are highly sensitive to acidification with little ability to neutralize acids resulting from sulfur and nitrogen pollution. Certain high elevation Park streams have the highest nitrate levels of any systems in the U.S. draining undisturbed watersheds. Certain high elevation soils in the Park are experiencing advance stages of nitrogen saturation, causing leaching of forest nutrients like calcium and mobilizing toxic aluminum that can hurt vegetation (by inhibiting uptake of nutrients) as well as biota in streams.

Revised EPA Public Health Standards for O₃ and PM and Reduction Strategies for Ozone: Effective July 1997 the EPA promulgated revised NAAQS for ozone and particulate matter. The new ozone standard, designed to provide

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greater protection of public health, tightened the standard from the previous 0.12 parts per million (ppm) for a one-hour

period to 0.08 ppm averaged over an eight-hour period. Under this new standard, the Park has recorded 191 days of unhealthy levels of ozone since 1997. Both Governors from TN and NC proposed to EPA that the Park be designated as non-attainment for the 8-hour ozone standard. Final designations will be made by EPA on April 15, 2004. Counties in non-attainment will likely be required by state and local regulatory programs to take measures to reduce emissions from stationary and mobile sources in order to lower their pollution levels.

The park is also part of the Knoxville and Asheville Early Action Compacts that defer ozone non-attainment and provide cleaner air sooner (but still must meet the ozone standard by 2007). The EPA in October 1998 passed the NOx State Implementation Plan (SIP) call, which requires 22 eastern states to reduce their NOx emissions by approximately 30 percent by 2005. TVA has been making significant reductions in NOx to meet this Rule. The EPA also documented power plant emission violations from several utilities (including TVA) and Department of Justice is taking legal enforcement action against them which could result in emission reductions and/or fines. Final decisions are still pending on that case with TVA.

Clear Skies Act - Multi-pollutant Strategy: A multi-pollutant reduction strategy for SO₂, NO_x, mercury, and CO₂ is currently being negotiated by Congress and the Bush Administration. The Bush Administration tried to pass the Clear Skies Act, but Congress has been unsuccessful in passing this legislation. This approach levels the playing field, creates equity and long-term certainty among the regulated community. This would require older power plants to install modern pollution control technology or otherwise comply with more stringent emission limits. EPA also introduced the Transport Rule, which is a similar multi-pollutant approach.

Service Position: The Park is relying on the Clean Air Act to restore air quality until any new approaches are passed. The Clear Skies Act or Transport Rule would provide significant emissions reductions and improve air quality at the park. New emissions permits should be granted only when "best available control technology" is planned and when offsets are implemented to prevent any net increase in pollutants. The NPS also supports the strictest possible state regulations on existing stationary and mobile sources and other emissions that contribute to the air pollution problems at GRSM. The best way to do this is through national multi-pollutant legislation. Large decreases >70% will be needed to improve and restore ecosystems in the park.

Position of Major Constituents: The EPA, the USDA-Forest Service, Fish and Wildlife Service and several environmental groups support our position. The public generally supports preserving the Park, but some are concerned that limiting emissions might limit economic growth. Most southeastern states have acknowledged that damage is occurring to Park resources at GRSM but few have agreed to act upon our recommendations to significantly lower and control emissions. The southern states at this time do not require new emissions to be offset, unless the source is impacting an area that is exceeding the NAAQS.

Action Required: Continue to work with state and local regulatory programs, the EPA, environmental groups, and industrial interests in developing a comprehensive plan to remedy existing impacts and prevent future damage through such measures as offset programs, use of improved technology, setting state emission caps for various pollutants, cleaner and renewable energies, PSD, SIP, and ultimately reducing sulfur dioxide and nitrogen oxides pollution to levels that protect AQRVs.

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